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WHAT IS CLAIMED IS:

1. An improved method for the production of 1,3-propanediol from a microorganism comprising the steps of:
  - a) obtaining a recombinant microorganism capable of producing 1,3-propanediol, said microorganism comprising at least one nucleic acid encoding a dehydratase activity and a nucleic acid encoding protein X; and
  - b) culturing the recombinant microorganism in the presence of at least one carbon source capable of being converted to 1,3 propanediol in said transformed microorganism and under conditions suitable for the production of 1,3 propanediol wherein the carbon source is selected from the group consisting of monosaccharides, oligosaccharides, polysaccharides, and a one carbon substrate.
2. The method of Claim 1 wherein said recombinant microorganism comprises at least one nucleic acid encoding a protein selected from the group consisting of protein 1, protein 2 and protein 3.
3. The method of Claim 1 further comprising the step of recovering the 1,3 propanediol.
4. The method of Claim 1 wherein the nucleic acid encoding protein X is isolated from a glycerol dehydratase gene cluster.
5. The method of Claim 1 wherein the nucleic acid encoding protein X is isolated from a diol dehydratase gene cluster.
6. The method of Claim 4 wherein the glycerol dehydratase gene cluster is from an organism selected from the genera consisting of Klebsiella and Citrobactor.
7. The method of Claim 5 wherein the diol dehydratase gene cluster is from an organism selected from the genera consisting of Klebsiella, Clostridium and Salmonella.
8. The method of Claim 1 wherein the nucleic acid encoding a dehydratase activity is heterologous to the organism.
9. The method of Claim 1 wherein the nucleic acid encoding a dehydratase activity is homologous to the organism.

10. The method of Claim 1 wherein the recombinant microorganism is selected from the group of genera consisting of *Citrobacter*, *Enterobacter*, *Clostridium*, *Klebsiella*, *Aerobacter*, *Lactobacillus*, *Aspergillus*, *Saccharomyces*, *Schizosaccharomyces*, *Zygosaccharomyces*, *Pichia*, *Kluyveromyces*, *Candida*, *Hansenula*, *Debaryomyces*, *Mucor*, *Torulopsis*, *Methylobacter*, *Escherichia*, *Salmonella*, *Bacillus*, *Streptomyces* and *Pseudomonas*.

11. The method of Claim 10 wherein the microorganism is selected from the group consisting of *E.coli* and *Klebsiella spp.*

12. The method of Claim 1 wherein the nucleic acid encoding protein X is stably maintained in the host genome.

13. The method of Claim 2 wherein at least one nucleic acid encoding a protein selected from protein 1, protein 2 and protein 3 is stably maintained in the host genome.

14. The method of Claim 1 wherein the carbon source is glucose.

15. The method of Claim 1 wherein the nucleic acid encoding protein X has the sequence as shown in SEQ ID NO: 59.

16. The method of Claim 2 wherein protein 1 has the sequence as shown in SEQ ID NO: 60 or SEQ ID NO: 61.

17. The method of Claim 2 wherein protein 2 has the sequence as shown in SEQ ID NO: 62 or SEQ ID NO: 63.

18. The method of Claim 2 wherein protein 3 has the sequence as shown in SEQ ID NO: 64 or SEQ ID NO: 65.

19. A recombinant microorganism capable of producing 1,3-propanediol from a carbon source said recombinant microorganism comprising a) at least one nucleic acid encoding a dehydratase activity; b) at least one nucleic acid encoding a glycerol-3-phosphatase; and c) at least one nucleic acid encoding protein X.

20. The recombinant microorganism of Claim 19 further comprising d) at least one nucleic acid encoding a protein selected from the group consisting of protein 1, protein 2 and protein 3.

21. The recombinant microorganism of Claim 19 selected from the group consisting of *Citrobacter*, *Enterobacter*, *Clostridium*, *Klebsiella*, *Aerobacter*, *Lactobacillus*, *Aspergillus*, *Saccharomyces*, *Schizosaccharomyces*, *Zygosaccharomyces*, *Pichia*, *Kluyveromyces*, *Candida*, *Hansenula*, *Debaryomyces*, *Mucor*, *Torulopsis*, *Methylobacter*, *Escherichia*, *Salmonella*, *Bacillus*, *Streptomyces* and *Pseudomonas*.

22. The recombinant microorganism of Claim 19 wherein the nucleic acid encoding protein X is isolated from a glycerol dehydratase gene cluster.

23. The recombinant microorganism of Claim 19 wherein the nucleic acid encoding protein X is isolated from a diol dehydratase gene cluster.

24. The recombinant microorganism of Claim 22 wherein the glycerol dehydratase gene cluster is from an organism selected from the genera consisting of *Klebsiella* and *Citrobacter*.

25. The recombinant microorganism of Claim 23 wherein the diol dehydratase gene cluster is from an organism selected from the genera consisting of *Klebsiella*, *Clostridium* and *Salmonella*.

26. The recombinant microorganism of Claim 19 wherein said dehydratase activity is heterologous to said microorganism.

27. The recombinant microorganism of Claim 19 wherein said dehydratase activity is homologous to said microorganism.

28. The recombinant microorganism of Claim 19 wherein the nucleic acid encoding protein X has the sequence as shown in SEQ ID NO: 59.

29. The recombinant microorganism of Claim 20 wherein protein 1 has the sequence as shown in SEQ ID NO: 60 or SEQ ID NO: 61.

30. The recombinant microorganism of Claim 20 wherein protein 2 has the sequence as shown in SEQ ID NO: 62 or SEQ ID NO: 63.

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31. The recombinant of Claim 20 wherein protein 3 has the sequence as shown in SEQ ID: 64 or SEQ ID NO: 65.

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32. A method for extending the half-life of dehydratase activity in a transformed microorganism capable of producing 1,3-propanediol and containing at least one nucleic acid encoding a dehydratase activity, comprising the step of introducing a nucleic acid encoding protein X into said microorganism and culturing under conditions suitable for production of 1,3-propanediol.

33. The method of Claim 32 wherein the nucleic acid encoding the dehydratase activity is heterologous to said microorganism.

34. The method of Claim 32 wherein the nucleic acid encoding the dehydratase activity is homologous to said microorganism.

35. The method of Claim 32 wherein the nucleic acid encoding protein X is isolated from a glycerol dehydratase gene cluster.

36. The method of Claim 32 wherein the nucleic acid encoding protein X is isolated from a diol dehydratase gene cluster.

37. The method of Claim 35 wherein the glycerol dehydratase gene cluster is from an organism selected from the genera consisting of *Klebsiella* and *Citrobacter*.

38. The method of Claim 34 wherein the diol dehydratase gene cluster is from an organism selected from the genera consisting of *Klebsiella*, *Clostridium* and *Salmonella*.

39. The method of Claim 32 wherein the microorganism is selected from the group consisting of *Citrobacter*, *Enterobacter*, *Clostridium*, *Klebsiella*, *Aerobacter*, *Lactobacillus*, *Aspergillus*, *Saccharomyces*, *Schizosaccharomyces*, *Zygosaccharomyces*, *Pichia*, *Kluyveromyces*, *Candida*, *Hansenula*, *Debaryomyces*, *Mucor*, *Torulopsis*, *Methylobacter*, *Escherichia*, *Salmonella*, *Bacillus*, *Streptomyces* and *Pseudomonas*.

40. The method of Claim 32 further comprising the step of introducing at least one nucleic acid encoding protein 1, protein 2 or protein 3 into said microorganism.

add B5

AMENDED SHEET